

## Preliminary

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

## MT6L61AS

VHF-UHF Band Low Noise Amplifier Application

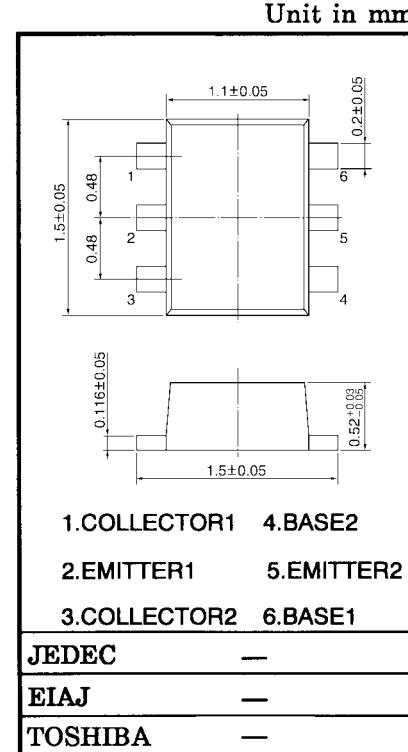
VHF-UHF Band Oscillator Application

## Maximum Ratings (Ta = 25°C)

| Characteristics             | Symbol                     | Rating  |    | Unit |
|-----------------------------|----------------------------|---------|----|------|
|                             |                            | Q1      | Q2 |      |
| Collector-base voltage      | V <sub>CBO</sub>           | 10      | 10 | V    |
| Collector-emitter voltage   | V <sub>CEO</sub>           | 5       | 5  | V    |
| Emitter-base voltage        | V <sub>EBO</sub>           | 1.5     | 2  | V    |
| Collector current           | I <sub>C</sub>             | 25      | 40 | mA   |
| Base current                | I <sub>B</sub>             | 10      | 10 | mA   |
| Collector power dissipation | P <sub>C</sub><br>(Note 1) | 100     |    | mW   |
| Junction temperature        | T <sub>j</sub>             | 125     |    | °C   |
| Storage temperature range   | T <sub>stg</sub>           | -55~125 |    | °C   |

Note 1: Total power dissipation of Q1 and Q2

|                             | Q1      | Q2       |
|-----------------------------|---------|----------|
| Three pin SSM type part No. | MT3S07S | MT3S04AS |



Weight: 2.1 mg

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## Electrical Characteristics Q1-Side (Ta = 25°C)

| Characteristics              | Symbol            | Test Condition   | Min | Typ. | Max  | Unit          |
|------------------------------|-------------------|--|-----|------|------|---------------|
| Collector cut-off current    | $I_{CBO}$         | $V_{CB} = 5 \text{ V}, I_E = 0$                                | —   | —    | 0.1  | $\mu\text{A}$ |
| Emitter cut-off current      | $I_{EBO}$         | $V_{EB} = 1 \text{ V}, I_C = 0$                                | —   | —    | 1    | $\mu\text{A}$ |
| DC current gain              | $h_{FE}$          | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}$                     | 70  | —    | 140  | —             |
| Transition frequency         | $f_T$             | $V_{CE} = 3 \text{ V}, I_C = 10 \text{ mA}$                    | 10  | 12   | —    | GHz           |
| Insertion gain               | $ S_{21e} ^2$ (1) | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, f = 2 \text{ GHz}$  | —   | 7    | —    | dB            |
|                              | $ S_{21e} ^2$ (2) | $V_{CE} = 3 \text{ V}, I_C = 15 \text{ mA}, f = 2 \text{ GHz}$ | 6.5 | 8.5  | —    |               |
| Noise figure                 | NF (1)            | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, f = 2 \text{ GHz}$  | —   | 1.6  | 3    | dB            |
|                              | NF (2)            | $V_{CE} = 3 \text{ V}, I_C = 5 \text{ mA}, f = 2 \text{ GHz}$  | —   | 1.5  | 3    |               |
| Reverse transfer capacitance | $C_{re}$          | $V_{CB} = 1 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ (Note 2)    | —   | 0.45 | 0.85 | pF            |

## Electrical Characteristics Q2-Side (Ta = 25°C)

| Characteristics              | Symbol            | Test Condition   | Min | Typ. | Max  | Unit          |
|------------------------------|-------------------|--|-----|------|------|---------------|
| Collector cut-off current    | $I_{CBO}$         | $V_{CB} = 5 \text{ V}, I_E = 0$                                | —   | —    | 0.1  | $\mu\text{A}$ |
| Emitter cut-off current      | $I_{EBO}$         | $V_{EB} = 1 \text{ V}, I_C = 0$                                | —   | —    | 1    | $\mu\text{A}$ |
| DC current gain              | $h_{FE}$          | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}$                     | 80  | —    | 160  | —             |
| Transition frequency         | $f_T$ (1)         | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}$                     | 2   | 4.5  | —    | GHz           |
|                              | $f_T$ (2)         | $V_{CE} = 3 \text{ V}, I_C = 7 \text{ mA}$                     | 5   | 7    | —    |               |
| Insertion gain               | $ S_{21e} ^2$ (1) | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, f = 1 \text{ GHz}$  | —   | 8.5  | —    | dB            |
|                              | $ S_{21e} ^2$ (2) | $V_{CE} = 3 \text{ V}, I_C = 20 \text{ mA}, f = 1 \text{ GHz}$ | 7.5 | 11   | —    |               |
| Noise figure                 | NF (1)            | $V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, f = 1 \text{ GHz}$  | —   | 1.3  | 2.2  | dB            |
|                              | NF (2)            | $V_{CE} = 3 \text{ V}, I_C = 7 \text{ mA}, f = 1 \text{ GHz}$  | —   | 1.2  | 2    |               |
| Reverse transfer capacitance | $C_{re}$          | $V_{CB} = 1 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ (Note 2)    | —   | 0.9  | 1.25 | pF            |

Note 2:  $C_{re}$  is measured by 3 terminal method with capacitance bridge.

## Marking

## Pin Assignment (top view)



## Caution

This device electrostatic sensitivity. Please handle with caution.